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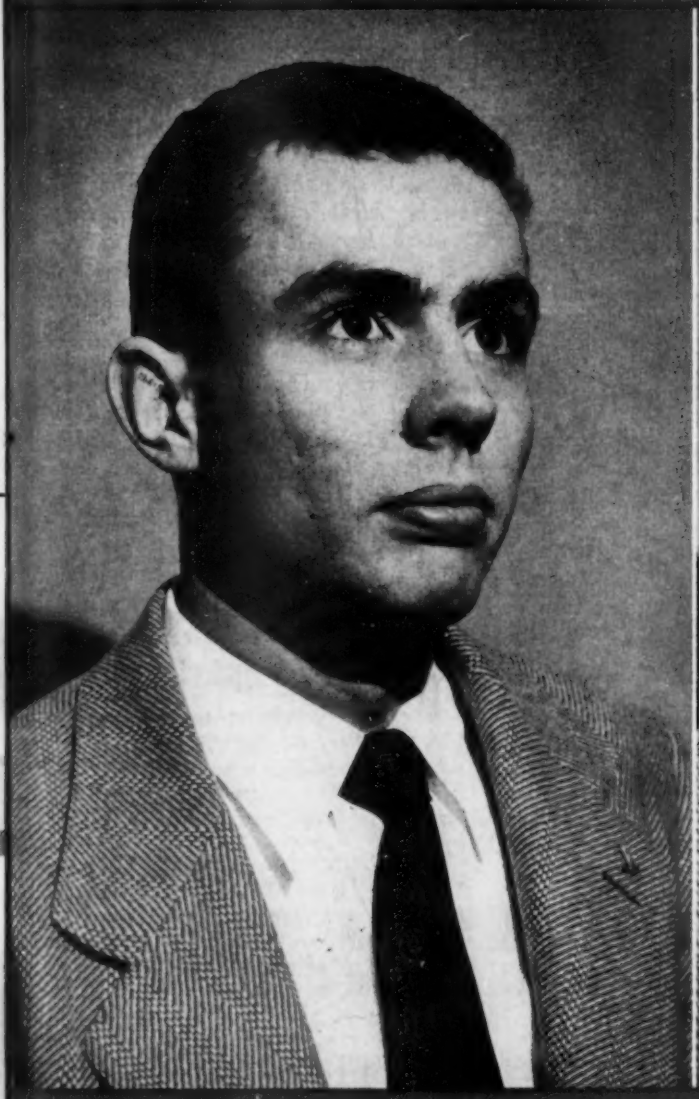
SCIENCE NEWS LETTER

TECHNOLOGY DEPT.

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Two Top Winners

See Page 162

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VOL. 61 NO. 11 PAGES 161-176

GENERAL SCIENCE

Top Scholarship Winners

Karl Muench, 17-year-old from Evanston, Ill., won the $2,800 award. Robert Braden of Princeton, N. J., won $2,000 scholarship.

See Front Cover

➤ THE MOST outstanding scientist among the nation's high school seniors is Karl H. Muench, a 17-year-old from Evanston, Ill. He was awarded the $2800 Westinghouse Grand Science Scholarship at the banquet in Washington that climaxed the Eleventh Annual Science Talent Search.

Dr. Harlow Shapley, director of the Harvard College Observatory, Cambridge, Mass., and president of SCIENCE SERVICE, presented the awards to the 40 top winners during the banquet ceremonies.

Second highest honor, $2,000 scholarship, went to Robert T. Braden, 18, a senior at Princeton (N. J.) High School. Winner of one of the eight $400 scholarships and alternate for the $2,000 scholarship was Louise Schmir, 16, a senior and tops in her class at Taft High School, New York.

Mr. Muench's project, an excerpt from which is printed on p. 175, was a study on what happened to hamsters when they were fed meat from roosters that had been chemically sterilized with diethylstilbestrol. He is a senior at Evanston (Ill.) Township High School.

Mr. Braden's winning project was entitled, "Constructing Logical Truth Tables with Punched Card Machinery," and his report discussed the application of computing machines to the problems of logic. A portion of his paper is printed on p. 175.

The two top winners are shown on the cover of this week's SCIENCE NEWS LETTER, Karl Muench on the left and Robert Braden on the right.

Miss Schmir's project involved basic concepts of geometry and was titled, "A Study of the Assumptions Underlying Euclidean and Non-Euclidean Geometry."

Seven other $400 scholarships and 30 $100 scholarships were also awarded. The 40 young scientists heard an address by Walter G. Whitman, Chairman of the Research and Development Board of the Department of Defense. (See SNL, March 8, p. 154).

Science News Letter, March 15, 1952

GENERAL SCIENCE

Winners of Scholarships

GRAND SCHOLARSHIP OF $2,800
Muench, Karl Hugo, Evanston, Ill.

$2,000 SCHOLARSHIP AND ALTERNATE FOR $2,800
Braden, Robert Taylor, Princeton, N. J.

ALTERNATE FOR $2,000
Schmir, Louise, New York, N. Y.

SCHOLARSHIPS OF $400
Armstrong, John Allan, Schenectady, N. Y.
Bideaux, Richard August, Tucson, Ariz.
Dolen, Richard, New York, N. Y.
Griswold, Ralph Edward, Atlanta, Ga.
Mitchell, Dana D., New Rochelle, N. Y.
Raudsep, Ilmar, New York, N. Y.
Schmir, Louise, New York, N. Y.
Shimansky, Judith Martha, Brooklyn, N. Y.

ALTERNATES
1st alt. Papadakis, Emmanuel Philippos, Omaha, Nebr.
2nd alt. Epstein, Eugene Ethan, Los Angeles, Calif.
3rd alt. Hobbie, Russell Klyver, Springfield, Mass.

SCHOLARSHIPS OF $100
Allen, Patricia Joan, Livingston, Mont.
Beck, Alice Eve, Mount Vernon, N. Y.
Berne, Joel Edward, Brooklyn, N. Y.
Boat, Mary Barbara, Poughkeepsie, N. Y.
Blanchard, Byron Elbert, Omaha, Nebr.
Colman, Robert Wolf, Far Rockaway, N. Y.
Dawson, Mary Ann, Connersville, Ind.
Dietrich, Charles William, Edwardsville, Ill.
Eddings, Charlotte Ann, Phoenix, Ariz.
Epstein, Eugene Ethan, Los Angeles, Calif.
Finch, Hardy Rundell, III, Greenwich, Conn.
Forman, Paul Frederick, New Rochelle, N. Y.
Goldstein, David Arthur, Rochester, N. Y.
Harrell, Ruth Flinn, Norfolk, Va.
Hartmann, Harry Rodney, New Brunswick, N. J.
Hobbie, Russell Klyver, Springfield, Mass.
Hooker, William Weston, Washington, D. C.
Klevay, Leslie Michael, Jr., Skokie, Ill.
Laufer, Wilma Phyllis, Forest Hills, N. Y.
Lieberman, Philip, Brooklyn, N. Y.
Luhrmann, George William, Jr., Andover, Mass.
McLeod, Donald Wingrove, Rochester, N. Y.
Messinger, Paul Hilton, Los Angeles, Calif.
Noyes, Russell, Jr., Bloomington, Ind.
Papadakis, Emmanuel Philippos, Omaha, Nebr.
Potthoff, Robert Edward, Urbana, Ill.
Richards, Paul Linford, Riverside, Calif.
Seaman, John Robert, Oceanside, N. Y.
Smith, David Young, Schenectady, N. Y.
Weiss, Bernard, Forest Hills, N. Y.

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SCIENCE TALENT INSTITUTE SCENES—Top left, ten top winners with W. G. Whitman, Dr. Shapley, and A. C. Monteith of Westinghouse Electric Corporation; top right, the two top winners being congratulated by Watson Davis and Mr. Whitman; 3, Dr. Horace Isbell of the National Bureau of Standards shows samples of "hot" sugars to two of the winners; 4, some of the 40 discuss the natural sciences with Drs. Remington Kellogg, Herbert Friedmann and Edward Chapin of the National Museum; 5, Dr. Dean Cowie shows a group of the winners the Carnegie Institution atom smasher; 6, Mr. and Mrs. Richard Milburn, STS winners in 1945, discuss their experiences since that time with three of this year's 40 young scientists; 7, Mary Ann Dawson blows out the candles on her birthday cake when she celebrated her 18th birthday at the Science Talent Institute on March 2; 8, two of the group examine an early German model of the basic V-2 rocket, while the test procedures are explained by Dr. Hermann H. Kurzweg of the Naval Ordnance Laboratory; 9, Paul Richards talks with his Congressman, The Honorable John Phillips (R., Calif.) at the Congressional Dinner.

BIOCHEMISTRY

A-Bomb Radiation Releases Dangerous Protein into Blood

➤ RECENT ATOMIC bomb tests have added further proof to a discovery that ferritin, an iron-bearing protein associated with the iron transport system in the blood, must be dealt with in the treatment of radiation injury.

Early in 1951 Drs. Thomas J. Haley and Richard F. Riley of the University of California at Los Angeles performed experiments on rats and discovered that exposure to X-rays liberated appreciable quantities of ferritin into the blood from the liver. This causes a paralysis of the peripheral vascular blood circulation and upsets the normal balance in the blood stream.

Dogs exposed to radiation in atomic bomb explosions showed identical effects of ferritin in the blood stream to those effects found in rats in the laboratories.

"When the greatest amount of ferritin is present in the blood stream, the irradiated animals are experiencing internal hemorrhaging," explained Dr. Haley, chief of the pharmacology and toxicology division in the U.C.L.A. Atomic Energy Project.

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ANIMAL NUTRITION

Detergents Speed Growth

Find growth spurt similar to that with antibiotics when soapless soaps are added to standard diets of hogs and chickens. Cheaper feed bills foreseen.

➤ FARMERS MAY some day sprinkle small amounts of detergents, the so-called soapless soaps, in the feed for chickens and hogs to speed the animals' growth.

This possibility is foreseen from experiments in both Michigan and Ohio that have shown about the same amount of growth spurt in chickens and hogs fed a standard diet plus laundering detergents as in those animals fed the same basic diet plus certain of the antibiotics, the miracle mold drugs.

If further tests show that the detergents do make chickens and hogs grow faster, great savings are in store for farmers, and ultimately for consumers, for these chemical are much cheaper than the antibiotics now used to speed the animals' growth.

C. M. Ely, of the research division of the National Distillers Products Corporation, Cincinnati, Ohio, reports that certain surface active agents, including commercial preparations for home and laundry use, "will promote an increase in growth ranging to 12% above controls."

His results were obtained in laboratory trials of more than two years' duration, and the important laboratory findings were checked in field trials. Some detergents did not prove beneficial, others did.

To find out how the detergents cause the more rapid growth will require testing them under a wide variety of conditions. Mr. Ely suggests two theories that might explain their action: they restrain or destroy certain bacteria in the intestine of the chick, and their wetting properties cause the nutrients in the chick feed to be assimilated more rapidly in the intestine.

Research scientists at Michigan State College agricultural experiment station, East Lansing, report that a surface active agent, an ethomid, gives a growth kick to hogs when added to a standard diet. The animals fed the ethomid gained nearly 1.3 pounds per day while those without the feed supplement gained only 1.1 pounds per day.

Work with the hogs was done by Drs. R. W. Luecke, J. A. Hoefer and Frank Thorp, Jr. They also suggest that the surface active agents could act either as germ-killers or by reducing surface tension to allow more effective absorption of the food nutrients.

U. S. Department of Agriculture scientists at Beltsville, Md., have made one test run with 20 chickens fed one of the same detergents used by Mr. Ely in his experiments. After eight weeks of growth, they found no difference in the response between 20 chicks fed the standard diet and 20 fed the standard diet plus the detergent supplement. New tests are scheduled to start at Beltsville within a month to check further into the growth response of chicks fed a standard diet plus detergents.

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TECHNOLOGY

Photocopies of Letters Made in Less than Minute

➤ PHOTOGRAPHIC COPIES of letters can be made in less than a minute by a new experimental method demonstrated by Dr. Cyril J. Staud, director of the Kodak Research Laboratories, Rochester, N. Y.

Based on a discovery made by a British scientist in 1879, a special photographic emulsion unaffected by ordinary room lighting is exposed to a bright light with the document to be copied. A special activating solution forms an image of soft gelatin containing a dark dye. When this is put in contact with a plain sheet of paper a thin layer of the dyed gelatin is transferred to give a positive copy of the letter ready for immediate use.

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Question Box

AERONAUTICS

In what way are birds dangerous to planes? p. 169.

BIOLOGY

How many new life forms are discovered annually? p. 168.

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VETERINARY MEDICINE

How will the new test for brucellosis speed spotting of the disease? p. 167.

Photographs: Cover, p. 163 and p. 173, Fremont Davis; p. 165, Consolidated Vultee Aircraft Corporation; p. 166, American Geographical Society; p. 170, George Pace—U. S. Department of Agriculture.

SCIENCE NEWS LETTER

VOL. 61 MARCH 15, 1952 No. 11

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BIOCHEMISTRY

Saliva Tells Sex of Unborn

Chemical analysis of saliva of expectant mother is positive if child is male, negative if female, in "nearly every case." Hormone believed basis of test.

➤ A CHEMICAL test of saliva that tells whether a boy or a girl baby will be born, has been developed by Dr. Gustav Wm. Rapp of Loyola University School of Dentistry and Dr. Garwood C. Richardson, assistant professor of obstetrics at Northwestern University Medical School, Chicago.

In "nearly every case" a positive test on the saliva of the expectant mother is associated with a male child and a negative test with a female child. Actual figures showed 218 positive and three negative tests in cases of boy births and seven positive but 148 negative tests in cases of girl births.

The presence of male or female hormone substances in the saliva of the expectant mother is apparently the basis of the test. This test for whether it will be a boy or girl developed from a pregnancy test worked out by Dr. Richardson.

The pregnancy test is positive as early as two weeks after conception, sometimes even before a missed period. It is based on the presence of free estrone, a female hormone, in contrast to bound or modified estrone or similar chemicals in the urine of the expectant mother.

Investigation of whether this hormone level rose in other body fluids, such as saliva, tears and perspiration, led to discovery of the prenatal sex determination test. When the Richardson pregnancy test was made on saliva, it was found that the test was positive in only some of the women who were in the sixth or seventh month of pregnancy, although the urine test was positive in each one.

The apparent answer came after the babies were born. Then the doctors found that almost every woman with the positive saliva test had a boy and almost every one with a negative test had a girl baby.

The exact nature of the substance responsible for the positive test is not known, Drs. Rapp and Richardson state in their report in the journal SCIENCE (March 7). They believe it is a male hormone substance because nonpregnant women who normally give a negative test give a positive saliva test after the injection of male hormone chemicals.

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JET WITH AFTERBURNER—First photo of the delta wing Convair XF-92A with the afterburner contained in the extended tail section is shown here. The afterburner adds substantially to the engine's thrust. The plane was built to explore and test flight characteristics of a true delta wing. After completing evaluation tests at Edwards Air Force Base, Calif., it will be delivered to the National Advisory Committee for Aeronautics for further research.

● RADIO

Saturday, March 22, 1952, 3:15-3:30 p.m. EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Mr. Don Mason, technical director of Freeport Sulphur Company, discusses "Sulphur, Essential Material in Industry."

PHYSICS

New Neutral Particle Extremely Short Lived

➤ A NEW subatomic particle of extremely short life has been discovered in cosmic rays recorded on photographic plates exposed at over 12 miles altitude.

The new zeta neutral particle exists for less than ten quadrillionths of a second. It decays into two pi mesons, of opposite sign. It weighs about 556 times as much as the electron.

Discovered by Drs. M. Danysz, W. O. Lock, and G. Yekutielli of the University of Bristol, the new particle is reported in a communication to the scientific journal, NATURE (March 1).

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MEDICINE

Viruses Without Tails Give New Cancer Attack

➤ VIRUSES WITHOUT tails may give scientists a new way of attacking the viruses that cause disease in man and animals, including some viruses that may play a part in cancer.

The tail-less viruses were announced by Dr. S. E. Luria of the University of Illinois research laboratories at the Second National Cancer Conference in Cincinnati.

The viruses lack tails because they are unfinished. They were produced by treatment with a reddish brown dye, proflavine, which is effective in the laboratory against many disease-causing agents and which has been used to treat infected wounds.

The dye attacks the virus at a vital step in its reproduction within the cell of the animal it has attacked. These incomplete viruses are no longer capable of attacking the cell. The tail-less or incomplete viruses consist almost completely of protein. They lack an essential component of all viruses, nucleic acid.

Human immunity to virus diseases may lie in the ability of the cells of the body to stop the virus from maturing within them, Dr. Luria suggested.

The incomplete viruses he and his associates produced were the kind that live on sewage bacteria. But he thinks there is good prospect of finding drugs that will stop the ripening of other viruses, thus making them incapable of reproducing in the body and causing sickness.

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MEDICINE

Report on Lincoln Methods

Lincoln methods of treating many ills produce no "beneficial organic changes" in patients, medical group finds after seven months' study.

➤ THE LINCOLN methods of treatment of cancer, tuberculosis, multiple sclerosis and other diseases have not helped any patients to recover.

This is the conclusion of the Massachusetts Medical Society which has had a committee investigating and studying the methods of treatment continuously for seven months.

The treatments, which make use of a bacteriophage, were developed by Dr. Robert E. Lincoln of West Medford, Mass. The study was instituted by agreement with Dr. Lincoln on June 27, 1951.

U. S. Senator Charles W. Tobey (R., N. H.) has been demanding that the medical profession investigate, approve and use these methods of treatment.

The conclusions of the medical society's committee were announced by Dr. W. Richard Ohler, Boston, president of the Massachusetts Medical Society. At the same time Dr. Ohler announced that Dr. Lincoln had been asked to resign from the Massachusetts Medical Society. The resignation was requested on unanimous vote of the society's committee on ethics and discipline after the committee had unanimously voted that Dr. Lincoln was "guilty as charged" with violation of the code of ethics binding on physicians, fellows of the Massachusetts Medical Society. It was pointed out that this decision does not affect Dr. Lincoln's status as a physician licensed to practice in Massachusetts.

Senator Tobey has served as chairman of the advisory board of the Lincoln Foundation Trust, established by Dr. Lincoln, his brother, Charles E. Lincoln, and Senator Tobey's son, Charles W. Tobey, Jr., lawyer of Concord, N. H.

Mr. Tobey, Jr., reported in a letter inserted in the CONGRESSIONAL RECORD last June that he had received the Lincoln treatments after a long period of other treatment and hospitalization for cancer. He stated in June that he could not say the Lincoln treatments were "totally responsible" for his state of good health but that he thought them worthy of investigation.

The official wording of the Massachusetts Medical Society's report on its investigation of the Lincoln treatments is "that no proof has been presented nor was any able to be obtained which has shown that beneficial organic changes have occurred in disease processes treated by Dr. Lincoln's therapy which have been due to that therapy and to that alone."

By "beneficial organic changes" is meant changes of a healing nature in body tissues in contrast to changes for the better in a patient's feelings. Experienced doctors know that starting a new treatment often is enough to make a patient feel better temporarily because of the hope a new treatment gives, even when the treatment does not have any effect on his sickness.

Among the thousands of patients Dr. Lincoln claims to have treated, the medical society was able to obtain definite information on the following:

Nine patients from Boston Sanatorium at Mattapan, all definitely diagnosed as having active pulmonary tuberculosis, all treated by Dr. Lincoln. Of these, two are dead, five are worse and two have continued improvement which was already established under sanatorium treatment with streptomycin.

Of the cancer cases cited in the report, four are dead and the others show improvement not attributable wholly to Dr. Lincoln's treatment.

Two patients with multiple sclerosis. One has relapsed to a greater degree than before seeing Dr. Lincoln and in addition has suffered loss of vision. The other, with symptoms of visual difficulty, was presented as "almost cured," but could not see two-inch letters with the right eye.

Discussing bacteriophage, which Dr. Lincoln uses in his treatment, the medical society report points out that this is "not entirely a harmless method of treatment."

Senator Tobey has charged that three patients died because the supply of treatment material, being made in a Boston medical school, was cut off. The medical society's investigation shows that although this material was not allowed to be delivered for a 48-hour period, enough was supplied before and after that period to more than make up the usual quantity.

The deaths referred to by Senator Tobey were of patients treated at a Lincoln "affiliate" institution in Corning, Ark. The Lincoln Foundation "Research Fellow" in charge of the treatments is a "Dr." J. S. Schirmer who apparently was a graduate of the Kansas City College of Medicine and Surgery, Kansas City, Mo., which has been exposed as a "diploma mill." His license to practice medicine in Arkansas is on the basis of reciprocity with Connecticut in 1921. But a grand jury investigation in Connecticut in 1924 resulted in the revocation of 175 fraudulent licenses, including that of Jacob Schirmer.

Jacob Schirmer, now a proponent of the Lincoln treatment methods, has reported previously that he has cured cancer with the Koch method. William Koch has been charged by the U. S. Food and Drug Administration with false and misleading label representations regarding his claims to curing cancer.

Chemists who analyzed the Koch cancer "cure" material reported it had the same composition as distilled water.

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WORMY WORLD MAP—Dr. Jacques May checks the U. S. rate of trichinosis on a new map recording the world distribution of worm parasites which cause human disease. Dr. May, author of the map, is head of the medical geography department of the American Geographical Society.

MEDICINE

New Drugs Fight TB

Much heralded anti-tuberculosis drugs are not preventives. If they are as effective as hoped, present shortage of hospital beds will probably be intensified.

➤ THE NEW, much heralded anti-tuberculosis drugs will probably intensify the present shortage of hospital beds instead of making possible conversion of tuberculosis hospitals to other uses, as some enthusiastic reports have claimed.

In some cases patients who would otherwise have died may be so helped by the new drugs that they will be able to benefit by other forms of treatment, including operations, to bring them to complete health. But in such cases, the patients will have to be in hospitals longer than they otherwise would. To put it brutally, when a patient dies a hospital bed is free just as it would be if a patient gets well and goes home. And death may free the bed faster than recovery.

Thousands of persons are now infected with tuberculosis germs who later will develop active disease. The new patients must be given the benefits of any new, effective drugs, for their own sakes and for the protection of other, uninfected persons. The latest new anti-TB drugs, Rimifon and Nydrazide, are not preventives of tuberculosis. But if they prove as effective as is hoped, efforts should be pushed to find and bring under treatment even more patients than are now in hospitals. This will add to the need, not decrease it, for hospital beds, physicians and surgeons, nurses, and rehabilitation and social service workers. (See SNL, Feb. 2., p. 72 and March 1, p. 132).

While these two new drugs seem to be giving good results in treatment now, some authorities feel almost certain that strains of germs resistant to them will develop in time. They explain it this way: The new drugs apparently stop TB germs by interfering with a chemical process vital to the germ's health and survival. Whenever this is done, the germ or other living organism is likely to find a way to bypass the block and carry on its chemistry by another route.

The new drugs, if and when germs become resistant to them, may be used in combination with streptomycin or some other drugs. This may help but is not expected to overcome completely the drug-resistance problem. Giving PAS with streptomycin results in only about 20% resistance developing instead of the 35% that develops when streptomycin alone is used. On the basis of test tube experiments, the PAS-streptomycin combination could be expected to result in no drug-resistance.

It does not because in the body, tuberculosis germs cause many spots of trouble, or lesions as they are termed medically. Streptomycin may reach some of these, PAS some others, and the combination still others. Where streptomycin alone reaches the TB germs, there is a chance for the germs in time to develop resistance.

Treatment of tuberculosis, even with the best modern drugs, takes time. Whether over a long period these drugs may cause damage to liver or to blood-forming organs has not yet been determined because there has not yet been enough time for such trouble to develop if it is going to.

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SEISMOLOGY

Japanese Tidal Waves

➤ ONLY A very small percentage of subsea earthquakes cause tidal waves such as those that rolled over the Japanese island of Hokkaido, devastating the coastal area and leaving thousands homeless.

The earthquake that caused the extensive damage was of magnitude 8.2 on a scale where 8.6 is the top ever recorded, seismologists at the U. S. Coast and Geodetic Survey reported. Energy released by the shock was roughly 100,000,000 times that of one of the A-bombs set off in the first atomic tests at Eniwetok. It is the largest earthquake since Assam, India, was rocked in August, 1950.

Epicenter of the earthquake was 143.5 E and 42.5 N. The shock was recorded on seismographs all over the world.

Seismologists call tidal waves tsunami, pronounced tsoo-nah-me, with equal accent on all syllables. The tidal waves got their start when a great break in the ocean bottom occurred, allowing one part of the earth's crust to slip past its neighbor, with a possible drop for maybe a dozen feet and carrying with it many millions of tons of sea water.

Ocean rushed into the vacated space and set up the tidal waves that, moving like water ripples in a tub, swept the coast of Hokkaido.

Earthquakes occur when strains in the earth's crust become too great. These strains are adjusted by the slips and breaks we know as earthquakes. The rocks of the crust are elastic like steel and will stand a certain amount of strain before they relieve it by such sudden movements.

A notable feature of tsunami is that the first motion usually noticed along a shore line is a withdrawal of the sea water, much as if there were an exceptionally low tide. Tsunami travel across the open ocean with a velocity of from 300 to 500 miles per hour. Although at sea the waves are usually much too small to be observed, they pile up to great heights when they hit shallow water. The crests have been known to reach 100 feet in height in shallow places.

The tidal waves measure from 100 to 400 miles from crest to crest. Measurements made at a spectacular tsunami in Hawaii in April, 1946, suggest that the first wave of a tsunami has a relatively small crest, so that the withdrawal motion, being more striking, is the first noticeable warning.

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VETERINARY MEDICINE

New Brucellosis Test Speeds Spotting of Disease

➤ A NEW method of testing for brucellosis in dairy herds will speed the nationwide fight against this disease. Developed by the Bureau of Animal Industry of the U. S. Department of Agriculture, it consists of a plate test using milk, similar to the test of blood now in use. Milk from a whole herd is tested and then, if the disease is present, blood tests will spot individual infected cows.

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AERONAUTICS

Automatic Pilot Gives Fliers More Gunnery Time

➤ AN AUTOMATIC pilot has been designed to relieve U. S. Navy fliers of 90% of their "stick and rudder" work.

Designated by the General Electric Co., Schenectady, N. Y., as the G-3, the autopilot will hold a plane at the desired barometric altitude within a 25-foot tolerance at 10,000 feet, will hold the plane within one-half of a degree on its course, will level off the plane from a bank or climb and will damp out effects of buffeting winds.

Gyroscopes and a compass feed electric signals into an amplifier which in turn operates the proper motor-driven airplane control-surface at the proper time to give satisfactory performance.

The pilot pushes a button when he wants the autopilot to take over. If the plane is banking or climbing, the device returns the plane to level flight when another button is depressed.

A miniature control stick allows the pilot to maneuver the plane even though the autopilot is working.

The device was developed to allow Navy pilots to devote more attention to navigation and gunnery while flying.

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ELECTRONICS

Computer Switch "Flips" In Millionth of a Second

➤ A NEWLY developed switch to be used with digital computers can operate in a millionth of a second.

Kenneth H. Olsen of the Massachusetts Institute of Technology reported to the Institute of Radio Engineers meeting in New York that the switch is smaller, more durable and requires fewer vacuum tubes than previous switches of its type.

Basically, the switch consists of tiny ring-shaped magnetic cores. Each core has an input winding, an output winding and several control windings.

Information which must be switched to its proper "pigeon hole" arrives at the core in the form of an electric current. The current induces magnetic flux in the core. The output winding picks up the flux from the core, converts it back into intelligence-carrying electricity and sends it on its way for storage.

If, however, the core in question is not the proper one, current flows in the control windings. That saturates the core with magnetic flux which blocks the signal from going out on the wrong circuit.

The device was designed by engineers at the MIT Digital Computer Laboratory. An eight-position demonstration model already has shown the practicality of the switch. MIT engineers now are working on two 16-position switches of similar types.

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BIOLOGY

Thousands of New Life Forms Discovered Annually

➤ EVERY YEAR scientists discover about 5,000 new kinds of insects, 2,000 new kinds of plants, 500 new shelled creatures or mollusks, 20 or 30 new mammals and only two or three new birds.

This information came from a panel led by Dr. Remington Kellogg, director of the U. S. National Museum.

Dr. Edward A. Chapin, curator of the division of insects, said that the number of species of insects in the world is just about incalculable but that about 5,000 new ones are recognized each year. He also told how the National Museum cooperated with Australia in finding an insect which would get rid of a cactus which had driven 600,000,000 acres of land out of cultivation.

They finally found a small moth in Uruguay which would eat the cactus and at the same time not feed on plants cultivated in Australia. It clears cactus from 2,000,000 acres a year.

Dr. Jason R. Swallen, curator of plants, said that 2,000 new species of plants were developed or discovered each year. He showed a new species of grass collected in South America.

More than 500 new species of snails and other shelled animals are discovered every year, Dr. R. Tucker Abbott, curator of mollusks, said during the discussion. Man, he said, has been in the "shell racket" for a long time. Ancient man used shells for money on the early trade routes. Mollusks are still important, in that some of them carry diseases which are fatal to man.

Twenty or 30 new kinds of mammals are discovered each year, said Dr. Charles O. Handley, assistant curator of mammals, but hundreds of sub-species are identified. He, himself, is now working on half a dozen new forms. Mammalogists are useful to many other fields of science, he pointed out.

There may only be about 100 species of birds still undiscovered, said Dr. Herbert Friedmann, curator of the museum's bird division, and only two or three are discovered each year.

The scientists made their reports at the Science Talent Institute.

Science News Letter, March 15, 1952

MEDICINE

Confuse Pneumonia And TB with Lung Cancer

➤ VIRUS PNEUMONIA and tuberculosis are being confused with lung cancer in far too many cases, Dr. Richard H. Overholt of Boston declared at the Second National Cancer Conference in Cincinnati.

He cited figures showing that 45 out of 100 lung cancer patients had first been diagnosed and treated as virus pneumonia or tuberculosis patients. Some of the remaining 55 out of the 100 had their lung trouble diagnosed and treated as asthma or some other condition.

Lung cancer is the second most common cause of cancer deaths among men. But it is one of the most detectable, and Dr. Overholt thinks the most detectable, of any internal cancer.

The way to detection of this killer is through mass chest X-ray surveys. Chest X-ray pictures will show the disease in its "silent" but highly curable stage. If patient or doctor waits for symptoms to develop, the cure rate is much lower.

Lung cancer when treated in this early, "silent," stage can be cured in 75 out of every 100 cases. This high cure rate, higher than for any other internal cancer, is still a theoretical one, Dr. Overholt said, because so far most patients who have had lung cancer detected and treated in this early stage have had this early diagnosis and treatment so recently that doctors cannot say yet that they have been cured.

Dr. Overholt reported on a study of about 1,000 lung cancer suspects, of whom 807 were positively diagnosed as having the disease. While almost half, 45, of the first 100 had their cancers misdiagnosed as virus pneumonia or tuberculosis, of the last 100 in the study, only 25 had this misdiagnosis.

Science News Letter, March 15, 1952

IN SCIENCE

ELECTRONICS

New TV Tubes Iron Out UHF Problems of Future

➤ A NEW receiving tube has been developed for television sets which not only is capable of tuning in standard very-high frequency television stations but also the ultra-high frequencies of future television stations.

Furthermore, a television transmitting tube which uses a forced-air cooling system instead of water has been designed to eliminate special water connections in ultra-high frequency television transmitters.

Known as a radio-frequency amplifier, the receiving tube was described by H. W. A. Chalberg, General Electric tube design engineer, as bridging a gap in the television industry because present receiver tubes will not operate over the entire UHF and VHF television frequency range.

He said existing tubes available for use in UHF tuners are unsuitable partly because of unconventional designs and prohibitive costs.

The new receiving tube is not as yet in commercial production, Mr. Chalberg said.

Meanwhile progress in television transmitting has been marked by a 1,000-watt transmitting tube which may rid future UHF television stations of cumbersome water cooling systems. Forced air rushes by the tube's radiator fins at one cubic foot a second.

Problems associated with high operating temperatures of transmitting tubes have been largely licked by replacing the conventional glass envelope with a ceramic and metal casing, GE engineers reported. The ceramic is made of talc and resists heat better than glass.

Science News Letter, March 15, 1952

INVENTION

Flame Cultivator Burns Weeds But Not Crops

➤ AN ATTACHMENT to a farm tractor which burns weeds but does not hurt the growing crops has been patented by James K. McNeill, Gary, Ind., and assigned to the International Harvester Company. He received patent number 2,587,873 for his invention.

The flame moves across the crop row, attacking the weeds and doing no substantial harm to the growing crops. It is more readily adaptable to the cultivation of plants which develop a large stem and a root system which firmly holds the plants in the soil, the inventor said.

Science News Letter, March 15, 1952

...CE FIELDS

AERONAUTICS

Birds Dangerous to Planes But Not Disastrous in U. S.

➤ BIRDS are as dangerous to airplane pilots as icy roads are to automobile drivers.

On the average, one bird strike a week occurs in the United States, said J. W. Lankford, chief of the accident analysis division of the Civil Aeronautics Board. He said, however, that no major air disaster in the United States has been attributed to birds.

Meanwhile, American experts are waiting to hear whether birds actually played a role in the airline accident recently near Nice, France.

Night-flying migrating birds offer the biggest problem because they are larger and fly at about the same altitude as commercial airliners. However, windshields have been developed to withstand impacts from the flying fowl.

Sea-gulls offer a special problem, Mr. Lankford said, because they like to feed on airports after rains drive worms to the ground's surface.

"They come in droves," he said, "and the least little noise will make them all take off at once. Even though they are light birds they still present a threat to pilots."

Small aircraft occasionally are forced to make precautionary landings after bird strikes because of possible damage to the wing fabric.

Science News Letter, March 15, 1952

MEDICINE

Fluorine Concentrates Are Harmless During Pregnancy

➤ EXPECTANT MOTHERS in communities where the drinking water is fluoridated to check tooth decay will concentrate some of the fluorine in the placenta, or afterbirth. The amount is too small, however, to have any harmful effect on the mothers.

The concentration of fluoride in the placenta was discovered in studies by Drs. Dwight E. Gardner, Frank A. Smith, Harold C. Hodge, D. E. Overton and Reuben Feltman of the University of Rochester School of Medicine and Dentistry, the New York State Department of Health and the division of dental research of the Passaic, N. J., General Hospital.

Previously Drs. Smith, Gardner and Hodge had found that the blood of persons living in Newburgh, N. Y., where the drinking water is fluoridated, contained almost three times as much fluoride as the blood of persons living in Rochester where the water is not fluoridated. In both cities, the blood content of fluoride is extremely low, that is, 1 to 10 millionths of a gram in 100 cc. of blood.

The amount of fluoride in placentas from Newburgh women is also almost three times as high as that in Rochester, the scientists report in the journal, SCIENCE (Feb. 22). Even in this tissue the fluoride content is low enough not to interfere with normal metabolism.

In both cities the placentas had a higher concentration of fluoride than the blood. The scientists suggest two possible explanations: 1. If fluoride is an essential trace element, the placenta may concentrate it to ensure an adequate supply to the unborn baby. 2. Since excessive fluoride is poisonous, the placenta may be acting as a barrier to keep more than trace amounts from reaching the unborn child.

How much of the accumulating fluoride passes from the placenta to the child has yet to be determined.

Much of the fluoride taken with drinking water, previous studies show, is excreted in the urine.

Science News Letter, March 15, 1952

GENERAL SCIENCE

Frankenstein's Monster Was a Comparative Piker

➤ A LEAD-LOADED steel skeleton having a tubular spine, a rudimentary wooden head, a chest of welded layers of perforated steel plate, a canvas skin, spring limit-joints, interchangeable pre-fabricated bones, a checker-board suit and a center of gravity equal to man's has, by comparison, made Frankenstein's monster look sick.

The British developed this synthetic man to test parachutes to be used by pilots flying high-speed aircraft. The dummy was designed to do everything an unconscious man would do while drifting toward the earth in a parachute.

Because testing conditions might be dangerous to a live man, the British searched their dummy-drome for a suitable substitute. An ordinary sack of sand, or even an ordinary dummy man was given the thumbs down because the distribution of weights would be wrong. That would make the man's center of gravity in the wrong place and his movements would be false.

"At first," said the Britishers, "it was thought that a simple stuffed man would be adequate, but the experts discovered that a man was very solid inside and only soft 'stuffing' on the surface."

So the British compiled a set of calculations based on 1,200 crew men's bodies. Each joint was carefully weighed. Every pre-fabricated bone had to be exactly right, from the center of gravity on.

Spring limit-stops were installed between the dummy's joints so that if an arm or leg were twisted beyond the human breaking point during descent in the parachute, it readily would be spotted by experimenters.

Science News Letter, March 15, 1952

INVENTION

New Germanium Alloys, Rectifier, Receive Patent

➤ NEW GERMANIUM alloys which combine the germanium with gases such as nitrogen, as well as other elements such as copper, silver, magnesium, titanium or uranium, and rectifiers made from those alloys received a patent recently.

Inventors were Dr. Karl Lark-Horovitz, head of the department of physics at Purdue University, Lafayette, Ind., and Dr. Randall M. Whaley, professor of physics at the same institution.

Dr. Lark-Horovitz, Seymour Benzer, Pasadena, Calif, and Robert E. Davis, East McKeesport, Pa., also received a patent for a photoresponsive and thermoresponsive cell utilizing germanium bombarded with neutrons so as to have alternating strips of negative and positive type conductivity. The two patents were numbered, respectively, 2,588,253 and 2,588,254.

The germanium alloys patented by Dr. Lark-Horovitz and Dr. Whaley may be used as semiconductors for rectifiers of the contact type which among other things can stand high, continuous operating voltages, have low forward resistances and high back resistances, do not require power for heating a cathode and do not require more space than about that needed for a common one-half watt carbon resistor.

The alloys patented are all of the class of negative-type semiconductors.

The second patent provides for a method of producing the alternating negative and positive strips by shielding alternate strips with a material which will protect them from bombardment.

Both patents were assigned to the Purdue Research Foundation.

Science News Letter, March 15, 1952

INVENTION

Patent Improvements in Garand Rifle Mechanism

➤ JOHN C. GARAND, Springfield, Mass., inventor of the famous Garand rifle carried by millions of Americans in World War II and in Korea, received patent number 2,587,611 for improvements in a valve mechanism on the rifle to be operated when a grenade launcher assembly is attached to the rifle. He assigned his patent to the government.

In launching a grenade with a rifle, he explained, the gases in the barrel build up a great deal of pressure. The purpose of the valve is to relieve that pressure and thus save the recoil mechanism of the rifle from excess wear. The valve is opened by force when the grenade launcher is attached to the rifle, but it cannot be jarred open when the launcher is not in use. The valve also closes readily after the launcher is removed.

Science News Letter, March 15, 1952

HORTICULTURE

Garden for Fun and Health

You can help the nation's defense effort by planting a "liberty" garden this spring. Government urges more food production in urban and suburban home gardens.

By ANN EWING

➤ FOR FUN and healthy exercise from now until next October:

Plant a "liberty" garden. You will, at the same time, be helping America's defense effort. And you will be assuring for yourself and your family, as well as your friends also perhaps, a steady and ample supply of vitamin-packed vegetables and other foods.

Seed catalogues are the earliest harbingers of spring; they are out now and many people already have made their selections for this year's planting. But if you have not done so, there is still time to plan and plant health-giving vegetables and your favorite flowers.

The government has called for more food production in urban and suburban home gardens as well as on farms during 1952. Such a program can make a real contribution to diets and health as well as to our food supply.

During World War II around 18,000,000 Victory Gardens produced over 4,000,000,000 quarts of home preserved food. Not only individuals, but industries, Boy Scouts, church groups, Parent-Teachers Associations and other organizations cooperated in the effort.

Manpower Savings

Every time a vegetable or fruit is served at or very close to the place where it was grown, there is saved for other purposes the amount of manpower necessary to package and ship it from its source to the consumer. And it also helps to make available its equivalent in other food stuffs needed by the armed forces.

So if you have or can use a little piece of land, with soil reasonably fertile, and if you have the patience to go on planting, tending and weeding after the first flush of spring-planting enthusiasm, then by all means help yourself to fun, fresh air and a part in the U. S. defense effort by starting a "liberty" garden this spring.

If you have only a small space for a garden, it is well to keep your planting list short, and put in it the vegetables that the family likes and that pay the highest return for the space they occupy. Tomatoes, snap beans, all leafy green vegetables, beets and lima beans are usually good bets for this.

Vegetables are grown—and eaten—for a number of values: for energy food elements, for proteins, for vitamins (particularly A and C), for bulk or roughage, for mineral salts (especially bone-building calcium) and finally, simply because they taste good—that is, for flavor.

Energy foods are primarily the starches and sugars: potatoes and other root crops; beans, peas and other legumes. Legumes are the great protein vegetables, though they do not compete with meat, eggs and dairy products. There is bulk or roughage in all fresh vegetables.

Vitamins and mineral salts are the things that receive most emphasis in present-day garden planning. Outstanding as vitamin vegetables are tomatoes, carrots, snap beans, all kinds of "greens." Worth noting is the fact that two rather neglected greens, collards and kale, outrank familiar and long-favored spinach. While beets and turnips do not rate very high as vitamin vegetables, their tops are among the best of "greens."

Old favorites, planted in almost every small garden simply because they taste good are the standby triad of radishes, onions and lettuce, although the last does have considerable vitamin value also.

New varieties, just introduced this year, that you may want to try include Salad Bowl lettuce, and Wade Snapbeans. If there is room in your garden, you may be delighted with the new dwarf watermelons. Originated in New Hampshire, one midget variety matures early and is just about the right size for an ice box, five to six inches in diameter.

Figure Needs Carefully

Before you rush out and buy a lot of seed, measure your ground and see how much you have room for, then figure how many feet of this and of that you will want, and buy accordingly. Your seed catalogue or the brief printed directions on the seed packets will tell you how much space the plants need for good growth. A good rule, unless you have room for a big garden, is to buy the smallest size packet offered of each kind that you want to grow. It is easy to get more later if you want them.

Several plantings of most vegetables should be made, anyway, to get a succession of fresh crops coming on through the season.

Gardening can be carried on very successfully with only a few simple tools. In

GARDEN PLANTING—Robert E. Wester, horticulturist at the U. S. Department of Agriculture, Beltsville, Md., shows here how small seed such as spinach, radish, lettuce and kale are planted in shallow furrows about one-half inch deep.

a pinch you can get along with just three: a four-tined spading fork, a hoe and a straight-backed, straight-toothed steel rake. A straight spade comes in handy, but you can get along without it if you must. That goes for a trowel, too; you can make an old butcher-knife do instead. You will also need a pair of sharpened stakes and a long string to mark your garden rows.

It is bad economy, of course, to lay out more money in tools, seed and fertilizer than you are likely to get back in carrots and tomatoes. But do not let an attempt at money-saving induce you to buy low-quality tools. That is bad economy, too. Get good tools, and take care of them.

Never leave your fork sticking in the ground, or your rake and hoe lying outdoors overnight, even in dry weather. Dew can encourage rust quite as readily as rain. Clean off all tools every night as soon as you have finished using them, and hang them away in garage or basement. It will not only make them last longer, but will be safer for the family. Children at play often get serious injuries from stepping on the upturned teeth of a rake or stumbling over the blade of a hoe.

Compost Improves Soil

Probably one of the best ways to improve your garden soil, unless you are lucky enough to have access to well-rotted stable manure, is to apply compost. To be ready for spring of 1953 you have to start a compost pile now. Rake up all last year's dead leaves you can get hold of—the moister and mustier the better—and pile them in a back corner of your lot. Throw some earth on them, and also a little manure if you can get it.

During the summer, pile all weeds from your garden and the clippings from your lawn on the heap, together with the clean vegetable and fruit parings and trimmings usually thrown into the garbage pail. Soil added to the heap has an important biological function: it introduces a complex swarm of fungi, bacteria and tiny earth-animals that reduce the raw vegetable tissues to the good black humus that makes soil fertile.

In addition to manure or compost it is always well to use some commercial fertilizer. But again you should calculate your costs, comparing them with what you expect to get out of your garden. Do not make the mistake of trying to force raw clay or dumped-in coal ashes into fertile soil by piling on expensive fertilizer out of a bag.

No blanket recommendations can be made for the kind of commercial fertilizer. The kind your dealer keeps for professional gardeners of your own region is likeliest to be satisfactory for small gardens as well.

It is impossible to give a hard-and-fast rule for quantity to use, but roughly about one pound for every 30 feet of garden row should be about right.

Fertilizer should be applied after the soil is spaded and raked, just before planting. One way is to lay a strip of the powder on top of the soil, a few inches away from the line where the seeds will go. If you put it right along with the seeds it will "burn" the tender seedlings. If you broadcast it all over the garden, some will be wasted.

Spading Hard Job

Spading up a garden in the spring is not as simple a job as it looks. The basic trick is to turn each forkful of soil completely over, so that what was at the top is at the bottom and vice versa. This is essential not only to getting the nutrients already in the soil properly distributed but also to aerate the soil and get the manure or compost fertilizer down where the roots will reach it.

You can tell when your soil is in the proper condition for spading by taking a lump and squeezing it between thumb and fingers. If it does not wad into mud, but gently breaks like a rich piecrust, then it is ready for spading.

When you have finished spading, and smoothing and leveling the surface with the rake, you are ready to plant. Set your stakes at either end of your plot and stretch the line between them, trace a furrow for the seeds, observing proper depth for the different kind of seeds, drop them in and cover them up. Be careful not to cover them with the fertilizer laid alongside.

Depths and spacing vary according to the size of the seed and the amount of space the plant takes up when grown. In general, the smaller the seed the shallower the planting.

Weeding Required

Planting is undoubtedly the most enjoyable part of growing a garden. But the job is not finished when the seeds are in the ground. A little hoeing and a great deal of laborious thumb-and-finger thinning and weeding are often necessary if you are to reap where you have sown. There are no particular instructions for weeding, but to keep everlastingly at it. The one important thing about hoeing is to do it often and thoroughly enough to kill all weeds between rows, but not too deeply, for that can cut off important feeding roots of plants you want to grow, and it will bring up dormant weed seeds from below to cause more trouble.

To water or not to water a garden, when summer dry weather comes, is a question that each gardener must decide for himself, mainly on the balance of costs in water and time on one side and of threatened loss of carefully tended crops on the other. If you do water, water thoroughly, for the water must get down to where the roots are if it is to do the plants any good.

Insect control and plant diseases in your garden are such a complex subject that no

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blanket recommendations can be given in a short space. At the first sign of disease or insect damage, consult your state college or agricultural experiment station's local agent. Experts there will be able to tell you the proper poison dust to apply. Insects and diseases can easily ruin the best garden, so an alert eye is needed.

Your garden need not be confined entirely to vegetable production. Several of the small fruits, such as the blueberry, strawberry, raspberry, blackberry and grape, will give you added variety as well as a taste treat during the summer.

Plant a few flowers, too. Here you can choose annuals, quick-producing perennials, or biennials planted now to bloom next year. You can have almost any size and shape and almost every color in the rainbow, so for your flowers, plant whatever suits your fancy best.

For the suburban or farm family which wants more information on garden possibilities for this year, a copy of "Suburban and Farm Vegetable Gardens" (H.G. No. 9) is available from the Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

Science News Letter, March 15, 1952

Reliable specific *tornado* forecasts cannot yet be made but meteorologists have learned the conditions which are favorable to the development of tornadoes over a wide area.

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Makers of SIMON, the Mechanical Brain, and SQUEE, the Robot Squirrel. (See cover pictures and articles in Radio Electronics, Oct. 1950, and Dec. 1951) Mr. Berkeley is author of Giant Brains or Machines that Think, Wiley, 1949.

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BOTANY

NATURE RAMBLINGS

Dry, But Not Warm

➤ JUST ABOUT now, or in a couple of weeks more at most, trees and shrubs will be unwrapping their buds and getting ready for another season of green growth.

The varnished scales that have enclosed them for months have served their turn and are now discarded; they litter the ground at the base of trees. Almost inevitably, some one will liken them to garments that have kept the young leaves and flowers dry and warm all winter long and can now be shed. Warm-blooded egocentrists that we are, we think of plants in human terms.

We would be nearer the facts if we stopped at the halfway point in our nursery metaphor. For bud-coverings keep the buds dry, but not warm. The tight-packed beginnings of leaves and flowers within the closely shingled roofs of scales become zero-cold when the outside air drops to zero.

The real job of the bud scales is to keep outside water out, and inside water in. Wet snow may fall until every twig is "ridged inch-deep with pearl," freezing rain may sheathe all the trees and bushes with ice, but within the tight little houses of the buds the coming spring's leaves and flowers reck nothing of it.

The scales are waterproof, so that moisture cannot penetrate; they are tenacious against outside pulling and buffetings. Only the pressure of swelling new life within will serve to push them open and finally break them off.

Probably even more important than their function in keeping buds dry is their opposite task of keeping them from drying out.

Science News Letter, March 15, 1952

PROJECTS EXHIBITED — Left to right, beginning at top: Ilmar Raudsep demonstrates the effects of ultra high frequency sound waves on moisture in the air; E. P. Papadakis, thrust tester for carbon dioxide cylinders used on model aircraft; D. Y. Smith, home-made Geiger counter; M. B. Boat, growing radish seeds without soil; J. R. Seaman, learning ability of hamsters; Louise Schmir, unusual films formed by soap solutions on metal shapes; G. W. Luhrmann, organisms in bacteriological culture; R. T. Braden, electric computer; W. W. Hooker, producing hydrogen peroxide by electrolysis; A. E. Beck, work of an archaeologist; and R. A. Bideaux, specimens from his mineral collection.

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The Nature of Some of Our Physical Concepts

by P. W. Bridgman

Professor of physics at Harvard University and Nobel Prize winner

Three lectures were given at the University of London in the spring of 1950. The particular object was to distinguish between the "instrumental" and the "paper and pen" component of the operations of the physicist. In the first lecture, among others, the concepts of field and empty space are examined, and it is shown that there is no instrumental operation by which action at a distance can be distinguished from action through a field. In the second lecture the fundamental concepts of thermodynamics are examined, and in the third the phenomena of conduction of electricity in massive conductors. $2.75

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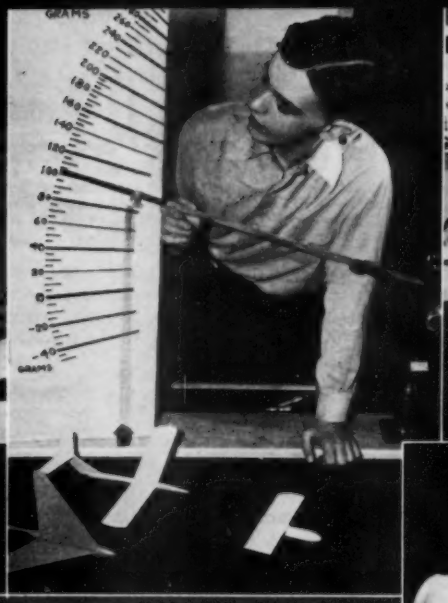
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ADVENTURES IN TWO WORLDS—A. J. Cronin—*McGraw-Hill*, 331 p., $4.00. The engrossing autobiography of a physician who is also a novelist, author of "The Citadel" and "The Keys of the Kingdom" as well as other works.

THE ANALOGY BETWEEN ELASTIC SOLIDS AND VISCOUS FLUIDS—V. G. Szebehely and D. H. Pletta—*Virginia Polytechnic Institute*, 24 p., paper, 25 cents. The mathematical tool used in this paper is tensor calculus.

CELLULOSE ACETATE PLASTICS—Vivian Stannett—*Chemical Publishing Co.*, 325 p., illus., $6.00.

COMMUNICATION OF TECHNICAL INFORMATION—Robert M. Dederich—*Chemonomics*, 116 p., paper, $5.00. Intended to tell the scientist how he can write so as to be understood by the business man.

THE DESERT YEAR—Joseph Wood Krutch—*Sloane*, 270 p., illus., $3.75. The author writes charmingly about nature in the Southwest to which he is not a mere visitor but friend.

DIALOGUES CONCERNING TWO NEW SCIENCES—Galileo Galilei, translated from the Italian and Latin into English by Henry Crew and Alfonso de Salvio—*Dover*, 300 p., illus., paper, $1.50. Galileo himself said of this work, completed in 1638, that it contains "results which I consider the most important of all my studies." It is here made available to students in an inexpensive edition.

DOCTORS IN BLUE: The Medical History of the Union Army in the Civil War—George Worthington Adams—*Schuman*, 253 p., illus., $4.00. In the Civil War there were 400,000 cases of wounds and sickness and 6,000,000 cases of sickness. That war saw the start of ambulance field work and the Army Nurse Corps.

FIELD CROP INSECTS—F. A. Fenton—*Macmillan*, 405 p., illus., $5.75. A text for agriculture students covering the basic principles underlying crop protection.

FOUNDATIONS OF AERODYNAMICS OF HIGH SPEED—George F. Carrier, Ed.—*Dover*, 286 p., illus., paper, $1.75. Facsimiles of nineteen classic studies as they appeared in scientific journals from 1870 to 1950.

THE GARDENER'S TROUBLE SHOOTER—Victor H. Ries—*Sheridan House*, 320 p., illus., $3.50. Just what you need to know about how to make flowers and vegetables grow.

LAND REFORM IN ASIA: A Case Study—C. Clyde Mitchell—*National Planning Association*, 34 p., paper, 50 cents. Describing the experience of South Korea with a land reform program carried out before the Communist invasion and contrasting sharply with the communist type.

MANUAL FOR CHEVROLET OWNERS—C. E. (Ed) Packer—*Popular Mechanics Press*, 304 p., illus., $3.50. To tell you how to see, feel, hear or smell trouble and how to repair it yourself or what to expect at the garage.

MATTER AND MOTION—J. Clerk Maxwell—*Dover*, 163 p., illus., paper, $1.25. A classic of science reprinted with notes by Sir Joseph Larmor.

THE MERCK INDEX OF CHEMICALS AND DRUGS: An Encyclopedia for the Chemist, Pharmacist, Physician and Allied Professions—*Merck & Co.*, 6th ed., 1167 p., $7.50 regular edition, $8.00 thumb-index edition. A new edition of this valuable reference work listing some 20,000 names of chemicals and drugs. Includes an up-to-date periodic table, table of radioactive isotopes and other new material.

THE NATIONAL RESEARCH COUNCIL REVIEW 1951—*National Research Council (Canada)*, 285 p., illus., paper, 75 cents. Reporting research conducted during the year, including the work of the Chalk River Atomic Energy Project.

ON INTERCOURSE AND PREGNANCY—Hippocrates, translated by Tage U. H. Ellinger—*Schuman*, 128 p., $2.50. Earliest preserved manuscript of a treatise on the physiology of reproduction, human embryology, and heredity presenting the theories held in the fifth century before Christ.

PALOMAR: The World's Largest Telescope—Helen Wright—*Macmillan*, 188 p., illus., $3.75. The story of the big 200-inch telescope from the first dream to final completion and dedication.

PASTEURIZATION OF LIQUID WHOLE EGG UNDER COMMERCIAL CONDITIONS TO ELIMINATE SALMONELLA—Harry E. Goresline, and others—*Govt. Printing Office*, USDA Circular No. 897, 15 p., illus., paper, 5 cents.

THE PHASE RULE AND ITS APPLICATIONS—Alexander Findlay—*Dover*, 9th ed., 494 p., illus., paper, $1.90. This new edition of a classic has been revised and brought up to date by A. N. Campbell and N. O. Smith.

SCIENCE: A Story of Discovery and Progress—Ira C. Davis, John Burnett and E. Wayne Gross—*Holt*, Rev. ed., 562 p., illus., $3.44. A high-school text in which each unit begins with a list of questions to be answered and words introduced.

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GENERAL SCIENCE

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MUENCH WRITES

"Absence of cancers is insignificant, since the hamsters were kept on chicken diets for only a short time.

"Therefore, although a decisive conclusion cannot be drawn, the evidence seems to favor the fact that chemically sterilized roosters contain appreciable amounts of stilbestrol in their edible portions, perhaps enough to produce the aforementioned deleterious effects in human beings if consumed for a long period of time. It is acknowledged in making this statement that the hamsters consumed far more chicken per body weight per period of time than a human being would and that, of all mammals, human beings are least affected by stilbestrol. However, the possibility of stilbestrol being used to chemically sterilize other meat animals in the future must be considered in deciding the total possible amount of hormone a human being could ingest.

"The question remains unanswered. This paper merely contributes a minute part to the solution."

—From the report of Karl Muench.

BRADEN WRITES

"A. SELECTOR CIRCUIT METHOD

This method is based on the analogy between relay circuits and logical statements. The relay network which is analogous to a given expression is tested for an open or closed circuit for each of the 2^n combinations of states of its n relays. If we put the results in tabular form, with an open circuit represented by O and a closed circuit represented by 1, we have a truth table for the given expression. Several specialized logical truth computers have been built recently using relay networks.

"1. Plugged circuit method.

(1) The contacts of the selectors are plugged together to form the analogous network.

(2) The selectors are put in each of the 2^n combinations of positions by punched cards.

(3) The network is tested for a closed circuit by putting a constant digit impulse into one end, while the other end is connected to a print or punch magnet to record the results.

The comparing circuits of the tabulators are OR ELSE circuits already built into the machine, and can be used in the network for evaluating that connective. The comparing circuits of the collator can be used to evaluate the OR ELSE, IMPLIES, and ONLY IF connectives.

"2. Card-programmed method.

Instead of specifically plugging the plugboard for each problem, we can use a general plugboard and program specific problems by cards. Each program card computes one logical connective, and one pass of the whole deck evaluates the expression for only one combination of T. F. V.'s (truth—falsity—value) of the component propositions. One possible method which I have tried and found successful is to connect the machine as a general logical computer. It has a "memory" in which numerical T. F. V.'s can be stored; and an "arithmetic unit", in which any two T. F. V.'s selected from the memory can be combined by any logical connective."

—From the report of Robert Braden.

Science News Letter, March 15, 1952

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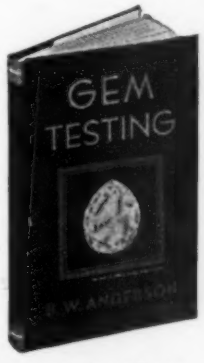

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Science News Letter, March 15, 1952

PLASTIC SAFETY lenses, half the weight of their glass counterparts, have been developed to withstand breakage and to protect industrial workers' eyes. They are resistant to splashing chemicals, welding spatter, emery wheel sparks and the impact of hard, small, high-velocity particles. The "glasses" have high scratch-resistant qualities.

Science News Letter, March 15, 1952

SCRUB BRUSHES with long handles have been developed which will outwear five ordinary brushes, according to the manufacturer. The brushes employ stiff bristles made of Bakelite styrene plastic.

Science News Letter, March 15, 1952

WEAVING DEVICE allows the housewife to re-weave moth-eaten or torn garments. Tweezer-like needles catch hold of frayed threads of the patch, pushing them through to the underside of the material.

Science News Letter, March 15, 1952

HAND TALKIE, weighing six-and-one-half pounds, has FM transmitter and receiver for 44 frequencies. It operates up to one mile in rough country, is waterproof, and works where temperatures reach 40 degrees below zero Fahrenheit. It is shown in the photograph.

Science News Letter, March 15, 1952

ULTRASONIC MACHINE for use in studying clotting blood, heart diseases and other medical problems has been devised. Known as the "Ultra-Viscoson," the machine will measure and indicate viscosities instantaneously.

Science News Letter, March 15, 1952

CEDAR COMPOUND made of crushed aromatic red cedar wood will provide cedar-closet protection for clothing. Impregnated with cedar oil, the compound is mixed with water by the user, then painted on walls with paint brush.

Science News Letter, March 15, 1952

PORTABLE, LIGHTWEIGHT projector with reflecting-projection system and automatic-focusing lens has been developed to aid the map maker in the field. It will transfer details from an aerial photograph directly to a drawing board.

Science News Letter, March 15, 1952

Do You Know?

The first recorded suggestion that the earth and other planets revolve around the *sun* is generally attributed to Aristarchus, an astronomer who lived on the Greek island of Samos about 265 B.C.

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Thermal indicators made of paper are capable of instantly determining *temperatures* from 115 degrees to 500 degrees Fahrenheit.

Losses from *corrosion* reach multi-billion dollar proportions.

The average life span of a *fly* is about two months.

The first exploratory steps to produce electric power from *atomic energy* have been taken, with four industry groups financing a one-year study on the feasibility of a nuclear reactor for making plutonium and power simultaneously.

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